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ship with the Amentiferae. In fact, this relationship is one argument for the primitive character of the Amentiferae.—J. M. C.

Translocation of sugar.—MANGHAM[18] has attempted to show that adsorption in the complex colloidal system of the protoplasm may play an important rôle in the translocation of sugar in the plant. The discussion is purely hypothetical, and it is rather hard to see how the main hypothesis is to be put on an experimental basis. A quotation from his summary will show the line of his reasoning.

> Adsorption compounds of albumen, lecithin, and glucose are known. It is suggested that in vegetable protoplasm there are present constituents capable of adsorbing sugars from solution. For any given concentration of sugar present in the liquid phase of the protoplasm, and the cell sap continuous with it, there would be a definite concentration of sugar present at the adsorbing surface. Any alteration of concentration in either region would lead to a readjustment of concentration equilibrium, which would be propagated as a wave through the system composed of the adsorbing particles and the solution immediately in contact with them. The rate of propagation of this wave would depend very much upon the degree of approximation of the particles under consideration, and would increase as the distance between them decreased. Connecting threads are assumed to provide a continuous protoplasmic pathway, though they impose restrictions varying with their frequency and tenuity.

Diffusion is generally recognized as being too slow to account for the considerable movement of sugars and other materials in plants. There must be mass movement to supplement molecular movements. MANGHAM'S hypothesis does not help us out in this respect because it must assume that "readjustment of concentration equilibrium" is brought about by diffusion so far as movement of the sugar molecule is concerned. The line between adsorption compounds and compounds due to chemical reactions is by no means a sharp one. In fact, it is one of the great battle lines in physical chemistry. One seriously doubts whether anything is gained by his assumption of adsorption compounds. There is much more evidence to support his view that sugar travels from cell to cell mainly by protoplasmic connections rather than by passing through the ectoplast, which is almost impermeable to sugar.—WM. CROCKER.

Physiological diseases.—BONCQUET[19] claims to have solved the mystery of certain plant diseases of the so-called physiological type, such as curly top of sugar beets, curly dwarf of potatoes, mottled leaf of potatoes, and mosaic disease of tobacco. Nitrites and ammonia were detected in the juices extracted from diseased plants. Their origin is supposed to be due to the action of nitrate-reducing bacteria, since the presence of these bacteria in the tissues runs parallel to the presence of nitrites and ammonia. The idea is advanced that the characteristic symptoms in all of these diseases are due to nitrogen starvation. The plants are deprived of nitrates taken up by the roots, because of their bacterial reduction to nitrites and ammonia.

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[18] MANGHAM, SYDNEY, On the mechanism of translocation in plant tissues. A hypothesis, with special reference to sugar conduction in sieve tubes. Ann. Botany **31**:293–311. 1917.

[19] BONCQUET, P. A., Presence of nitrites and ammonia in diseased plants. Jour. Amer. Chem. Soc. **38**:2572–2576. 1916.

BONCQUET, P. A., and BONCQUET, MARY, Presence of nitrites and ammonia in diseased plants. II. Oxidases and diastases; their relation to the disturbance. Jour. Amer. Chem. Soc. **39**:2088–2093. 1917.

The increase of the oxidases in the tissues of plants affected with some of these diseases has been well established. This biochemical phenomenon is easily incorporated into the author's hypothetical scheme. The results of an exhaustive microchemical study, including a histological method for the detection of oxidases, are said to indicate that the increase of the oxidases in the plants affected with bacterial nitrogen starvation is a direct effort of the physiological functions of the plants to overcome the reducing forces of the bacteria. In making such a statement it must be assumed that the oxidation of phenol derivatives by plant tissues is a measure of their power to oppose nitrate reduction. Experiments are recorded and arguments brought forth to show the increased tendency and effort of the diseased plant to make good the loss of nitrates by bacterial reduction. These arguments are not easily followed, as they seem to be based upon the theory that the absorption of salts by plants is a function of the amount of water taken up by the roots.

The announcement of the apparent ease with which supposed causal organisms have been isolated from tissues of plants affected with this class of disease is rather startling, since several years of persistent effort by a number of workers has hitherto failed to establish definitely the parasitic character of these diseases.—CHAS. O. APPLEMAN.